

BUREAU OF WATER

South Carolina Department of Health and Environmental Control

SHELLFISH MANAGEMENT AREA 16A

2006 ANNUAL UPDATE

Shellfish Sanitation Program

Water Monitoring, Assessment and Protection Division

Environmental Quality Control - Bureau of Water

2600 Bull Street

Columbia, South Carolina 29201

July 2006



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2006 ANNUAL UPDATE

[Data Thru December 2005]

Shellfish Management Area 16A Shellfish Sanitation Program



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A handwritten signature in black ink, reading 'Charles Gorman', is written over a horizontal line.

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ANNUAL UPDATE
Shellfish Management Area 16A
SCDHEC EQC Bureau of Water

Data Inclusive Dates:

01/01/03 thru 12/31/05

Classification Change:

X Yes No

Shoreline Survey Completed: Yes

(I)ncreased/(D)ecreased/(N)one:

D Approved

I Conditionally Approved

D Restricted

N Prohibited

Prior Report & Date: Annual -2005

SUMMARY

Editor's Note: In order to correct a station description/site location inaccuracy, Station 30 will be replaced by Station 37 beginning in January 2007.

Water quality at stations 25 and 30 (37) exceeds statistical criteria for the Approved classification. Analysis of bacteriological data collected during the three-year review period indicates that exclusion of samples collected within 14 days following 24-hour rainfall events of 1.10 inches or greater will allow the stations to meet Approved area criteria. Therefore, the Jenkins Creek area between Station 30 (37) and Station 35, including all marshlands surrounding Polawana and Warsaw Islands and Warsaw Flats be reclassified as Conditionally Approved classification and managed as part of the existing Jenkins Creek Conditional Area. Jenkins Creek, between Station 14 and Station 30 (37) will retain its current Conditionally Approved classification.

Station 23, Eddings Creek at small Tributary between stations 9 and 18, exceeds the statistical criteria for an Approved classification. Eddings Creek from Station 23 to Station 09 (Eddings Creek at Morgan River) will be reclassified as Restricted. This reclassification has the effect of restricting Eddings Creek in its entirety.

Due to its shallow location that does not allow sample collection without disturbing sediment and resulting in sample contamination, Station 32 has been deactivated and Station 38 created to more accurately assess water quality in Village creek. Village Creek will be classified as Restricted in its entirety until a minimum of 30 samples have been collected and evaluated from Station 38.

For the review period, Station 27 (Mouth of Coffin Creek) exceeds the statistical criteria for an Approved classification. Coffin Creek will remain Restricted in its entirety. The closest shellfish harvest areas are located approximately 1000 meters eastward of Station 27.

Station 16A-39 will be created at the confluence of Sparrow Nest Creek and Morgan River. Sparrow Nest Creek will be included as part of the Jenkins Creek Conditional Area.

INTRODUCTION

PURPOSE AND SCOPE

The authority to regulate the harvest, sanitation, processing and handling of shellfish is granted to the South Carolina Department of Health and Environmental Control by Section 44-1-140 of the Code of Laws of South Carolina, 1976, as amended. The Department promulgated Regulation 61-47, which provides the rules used to implement this authority and outlines the requirements applied in regulating shellfish sanitation in the State. This regulation specifically addresses classification of shellfish harvesting areas and requires that all areas be examined by sanitary and bacteriological surveys and classified into an appropriate shellfish harvesting classification.

The National Shellfish Sanitation Program (NSSP) Guide For The Control Of Molluscan Shellfish is used by the United States Food and Drug Administration (USFDA) to evaluate state shellfish sanitation programs. The NSSP Model Ordinance requires that a sanitary survey be in place for each growing area prior to its use as a source of shellfish for human consumption and prior to the area's classification as Approved, Conditionally Approved, Restricted, or Conditionally Restricted. Each sanitary survey shall be updated on an annual basis and accurately reflect changes which have occurred within the area. Requirement of the annual reevaluation include, at a minimum, field observations of pollution sources, an analysis of water quality data consisting of the past year's data in combination with appropriate previously collected data, review of reports and effluent samples from pollution sources, and review of performance standards for discharges impacting the growing area. A brief report documenting the findings shall also be provided.

The following criteria consistent with the NSSP Model Ordinance and S. C. Regulation 61-47 are used in establishing shellfish harvesting classifications:

Approved - Growing areas shall be classified Approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations which would render shellfish unsafe for human consumption. The Approved area classification shall be designated based upon a sanitary survey, which includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. For waters sampled under adverse pollution conditions, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN shall not exceed fourteen per one hundred milliliters, and not more than ten percent of the samples shall exceed a fecal coliform MPN of forty-three per one hundred milliliters (per five tube decimal dilution). For waters sampled under a systematic random sampling plan, the geometric mean fecal coliform Most Probable Number (MPN) shall not exceed fourteen per one hundred milliliters, and the estimated ninetieth percentile shall not exceed an MPN of forty three (per five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP Guidelines.

Conditionally Approved - Growing areas may be classified Conditionally Approved when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be

allowed shall be adopted by the Department prior to classifying an area as Conditionally Approved. Where appropriate, the management plan for each Conditionally Approved area shall include performance standards for sources of controllable pollution, e.g., wastewater treatment and collection systems, evaluation of each source of pollution, and means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate.

Restricted - Growing areas shall be classified Restricted when sanitary survey data show a limited degree of pollution or the presence of deleterious or poisonous substances to a degree which may cause the water quality to fluctuate unpredictably or at such a frequency that a Conditionally Approved classification is not feasible. Shellfish may be harvested from areas classified as Restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision. For Restricted areas to be utilized as a source of shellstock for depuration, or as source water for depuration, the fecal coliform geometric mean MPN of restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Conditionally Restricted - Growing areas may be classified Conditionally Restricted when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department prior to classifying an area as Conditionally Restricted. Where appropriate, the management plan for each Conditionally Restricted area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and description of the means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish may be harvested from areas classified as Conditionally Restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision. For Conditionally Restricted areas to be utilized as a source of shellstock for depuration, the fecal coliform geometric mean MPN of Conditionally Restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Prohibited - Growing areas are classified Prohibited if there is no current sanitary survey or if the sanitary survey or monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area or indicate that such

substances could potentially reach quantities which could render shellfish unfit or unsafe for human consumption.

BACKGROUND INFORMATION

Shellfish Management Area 16A consists of approximately 26,608 acres of shellfish growing area habitat located in Beaufort County. Area 16A includes the Morgan River and its tributaries, including Lucy Point, Parrot, Jenkins, Eddings, Village, and Coffin Creeks.

The area's northern boundary begins at the confluence of Lucy Point Creek and Coosaw River (Sam's Point) and follows the southern shoreline of Coosaw River and Morgan Island. The eastern boundary is defined by St. Helena Sound and the Atlantic Ocean. The southern boundary begins on the northwest shore of Harbor Island and follows Hwy 21 to Seaside Road (SR-77) and then is defined by an imaginary line extending to Land's End Road (SR-45). The boundary then continues back to Hwy 21. The southern boundary follows Hwy 21 to its intersection with SC 802, which defines the western boundary. The western boundary runs across Lady's Island along the western shore of Lucy Creek ending at Sam's Point.

Area 16A is largely rural, with expansive areas of agricultural land (particularly on St. Helena Island) used for growing tomatoes, cucumbers, and sod. The western boundary on Lady's Island is more suburban in character. Shrimp boat docks are located on Coffin (marina closure), Eddings (marina closure), and Jenkins Creeks (individual docks). A residential development on Dataw Island includes two golf courses and a marina.

The harvesting classification of Area 16A prior to this survey was as follows:

Prohibited: (Administrative closure)

- 1) Dataw Marina closure zone;
- 2) Coffin Creek commercial docks;
- 3) Eddings Creek (Rose Island) commercial docks.

Restricted:

- 1) Rock Springs Creek, from its headwaters to its confluence with Lucy Point Creek;
- 2) Eddings Creek, from headwaters to Station 23, excluding Prohibited closure zone.
- 3) Lucy Point Creek, from its confluence with Coosaw River to Station 13A.
- 4) Coffin Creek, from its headwaters to its confluence with Morgan River at sta. 27
- 5) Jenkins Creek, from station 37 (former station 30) to the confluence of Warsaw Flats and Morgan River.

Conditionally Approved:

- 1) Jenkins Creek, between stations 14 and 37 (former station 30)

Approved: The remaining waters of Area 16.

Station Addition/Deactivation/Modification:

Deactivation: Station 30; 500 ft. North of Stormwater at Dataw Island Golf Course,

Jenkins Creek. Lat/Lon 32-24-29 / 080-34-40. Station at wrong location on map. Station 37 created at correct sampling location.

Deactivation: Station 32; Village Creek at Fripp Point Community Dock. Lat/Lon 32-25-57 / 080-29-35. Creek silting in; very little shellfish resource. (New) station 38 more representative of water quality in Village Creek.

Addition: Station 33; Lucy Point Creek, approximately 3100 feet West of station 16A-13B

Addition: Station 34; Lucy Point Creek,

Addition: Station 35; Warsaw Flats at confluence with Morgan River

Addition: Station 36; Jenkins Creek, at Southern Point of Dataw Island

Addition: Station 37; Jenkins Creek at Polawana Island boat ramp. Correct location of sampling point for former station 30.

Addition: Station 38; Village Creek at confluence with small, unnamed tributary on Western bank.

The shellfish industry in South Carolina is based mainly on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams (*Mercenaria mercenaria*). Areas in South Carolina designated for commercial harvest by the South Carolina Department of Natural Resources (SCDNR) are defined as State Shellfish Grounds, Culture Permit areas, Mariculture Permit areas, and Kings Grant areas. There are four shellfish Culture Permit areas in Area 16A. C-114 and C-122 are leased to L.P. Maggioni & Company. C-128 is leased to Charlie Brown Seafood and C-131 is leased to Thomas Backman. There are four Mariculture Permit areas in Area 16A. Three are located adjacent to the Coffin Point State Shellfish Ground (S-127). M-109 is leased to Joel Morris, M-110 is leased to Charles Hall, and M-111 is leased to Joseph Leland. The fourth, M-112, in Jenkins Creek, is leased to Joel Morris.

The general public is allowed to harvest on three SSGs within Area 16. S-065 is located on Morgan Island, S-124 is in Morgan River, and S-127 is at Coffin Point. Recreational harvesting is allowed for clams and oysters in all areas, and commercial harvesting by licensed individuals is allowed, subject to conditions established by SCDNR.

Shellfish harvesting season in South Carolina extends from September 16 through May 15, although actual dates may vary. SCDNR has the authority to alter the shellfish harvesting season for management purposes. The South Carolina Department of Health and Environmental Control has the authority to prohibit shellfish harvesting when necessary to ensure that all shellfish harvested in South Carolina waters are safe for human consumption.

POLLUTION SOURCE SURVEY

SURVEY PROCEDURES

Shoreline surveys of Area 16A were conducted by the Low Country District Shellfish Sanitation staff, by watercraft, vehicle, and on foot, during the survey period and are ongoing.

POINT SOURCE POLLUTION

Major sources of actual or potential pollution (see Figure 4):

PERMITTED FACILITIES	PERMIT #/TYPE/ DISCHARGE
BJW&SA St. Helena WWTP	SC0039811/0.60MGD/spray irrigation
Dataw Island Marina	Marina/ with pumpout (closure 60' from ends)
Coffin Creek Commercial Docks	Marina (shrimp docks – closure 472')
Rose Island Commercial Docks	Marina (shrimp docks – closure 352' from center)

- A. **Municipal and Community Waste Treatment Facilities** - New sewer lines have been installed from Lady's Island and along Hwy 21 to the St. Helena WWTP, serving schools, businesses, and new subdivisions. Lady's Island Middle School formally had an aerated lagoon system with chlorination with tile field disposal of treated effluent. The discharge from this facility has been eliminated through incorporation into the BJW&SA St. Helena WWTP.

The recently upgraded BJW&SA St. Helena WWTP is an extended aeration type system with gas chlorination. Treated effluent is pumped to Dataw Island where it is spray irrigated on golf courses. A new spray site has been added on a sod farm in Area 16B.

- B. **Industrial wastes** - There are no permitted industrial discharges in Area 16A.
- C. **Marinas** - S.C. Regulation 61-47, Shellfish defines *Marina* as “any water area with a structure (docks, basin, floating docks, etc.) which is: 1) used for docking or otherwise mooring vessels; and, 2) constructed to provide temporary or permanent docking space for more than ten boats, or has more than 200 linear feet of docking space.” There is a permitted marina at Dataw Island that has a marine sewage pumpout facility. There are commercial docks located in Eddings and Coffin Creeks that meet the current definition of marina. Closures around these facilities have been established.
- D. **Radionuclides** - Sources of radionuclides have not been identified within Area 16A, and radionuclide monitoring has not been conducted. No other sources of poisonous or deleterious substances have been identified within the area.

NONPOINT SOURCE POLLUTION

- A. Stormwater** - Stormwater runoff impacts water quality by transporting fecal coliform bacteria (and other pollutants) from land to the shellfish growing area. Stormwater from roads, residences, and agricultural land is directed to the lowest point of elevation which is often the nearest creek or marsh. In addition, there are freshwater wetland areas, ditches, and impoundments that drain into tidal creeks.

Beaufort County enacted a stormwater management utility in 2001. The stormwater utility assesses a stormwater fee to residential and non-residential property owners, and the fees collected are dedicated to stormwater-related activities. These may include operation and maintenance of stormwater systems, implementation of improvements to reduce stormwater-related problems such as flooding and stormwater runoff pollution, and related studies.

The Stormwater Master Plan (draft submitted in December 2004) and report were funded through the fees collected by the stormwater utility. The study was designed to identify problem areas related to stormwater, and to recommend a plan to solve problems and better control the impacts of stormwater on receiving waters in Beaufort County.

Most land disturbing activities in South Carolina must comply with the Stormwater Management and Sediment Reduction Act of 1991. The final regulations, effective on June 26, 1992, establish the procedures and minimum standards for a statewide stormwater management program. For activities in the eight coastal counties, additional water quality requirements are imposed. For all projects, regardless of size, which are located within one-half mile of a receiving water body in the coastal zone, the criteria for permanent water quality ponds having a permanent pool is that they are designed to store the first 2 inch of runoff from the entire site over a 24-hour period or storage of the first one inch of runoff from the built-upon portion of the property, whichever is greater. Storage may be accomplished through retention, detention, or infiltration systems, as appropriate for the specific site. In addition, for those projects that are located within 1000 feet of shellfish beds, the first one and one half inches of runoff from the built-upon portion of the property must be retained on site. Since 1992, these regulations have been applied to the development of residential subdivisions, golf courses, and business areas.

- B. Agricultural Waste** - Small herds of cattle are located near the headwaters of Eddings Creek and Coffin Point. Further investigation of these areas will be conducted to determine what impact they have on water quality.
- C. Individual Sewage Treatment and Disposal (ISTD) Systems** - The majority of homes adjacent to Area 16A utilize ISTDs for wastewater disposal.
- D. Wildlife and Domestic Animals** - This area supports populations of white-tailed deer, raccoons, wading birds, migratory waterfowl, and other wildlife, which may contribute to fecal coliform levels in some areas. Domestic animals present in the area include dogs, cats, horses, and goats.

- E. Boat Traffic** - The Morgan River provides access to St. Helena Sound and the Atlantic Ocean for shrimp boats and recreational boaters. There are numerous private boat docks throughout Area 16A.
- F. Hydrographic and Habitat Modification** - Hydrographic and habitat modification in estuarine areas requires both State and Federal approval.
- G. Marine Biotoxins** - There have been no documented occurrences of toxic algae affecting water quality in Area 16A. The Department participates in a State Task Force on Toxic Algae and maintains a toxic algae emergency response team.

HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

PHYSIOGRAPHY

Area 16A is part of the St. Helena Sound estuary. The estuary is a drowned river valley/bar built system containing numerous marsh islands and tidal creeks. It is among the largest of the South Atlantic estuaries. The average depth of the estuary is approximately 12 feet at mid-tide level. Extensive shallow areas and numerous tidal flats exist within the estuary. The AIWW (12 feet at MLW) is the only maintained navigational channel (NOAA, 1994).

Tides - Tides in Area 16A are semidiurnal, consisting of two low and high tides each lunar day. Mean tidal range is 5.9 feet during normal tides and 6.9 feet during spring tides. The greatest tidal ranges of the year typically occur around full moon during the months of September through December. There is considerable variation in the normal tide range due to the prevailing strength and direction of winds.

Rainfall - Rainfall data used in this survey is collected at a weather station located at the City of Beaufort WWTP (Station 380559- Beaufort 7 SW). The rainfall gauge is typically read at about 7:00 AM and the rainfall amount is recorded for that date. As most shellfish samples are collected after 7:00 AM, this report's rainfall summary table includes rainfall data for the sample date + 24 hours. Rainfall recorded for the sample date + 24 hours may correlate better and help explain elevated fecal coliform concentrations in sample results, particularly if there was zero rainfall recorded on the morning of, or a day prior to, sampling. The rainfall summary is included in Table #5.

Annual rainfall recorded at the Beaufort 7SW weather station was significantly below the 30-year normal amount for 2000 and 2001 (see Chart Beaufort Annual Rainfall). Below normal rainfall continued through May 2002 and, by August 2002, the drought status of all 46 counties in the state, including Beaufort and Colleton, had been upgraded to extreme. Above normal rainfall beginning in late August, however, led the S.C. Drought Response Committee to downgrade the drought status statewide and remove the drought declaration for Beaufort, Charleston, and Colleton counties on November 21, 2002.

Annual rainfall is normally about 51.15", with August being the wettest month. Charts showing yearly rainfall amounts for the years 1999 through 2005 are attached. Approximately

40% of the annual rainfall falls in the three-month period from June to August. Weather patterns during this time period are often characterized by thunderstorms and shower activity of a short duration. In addition, these three months also have the highest numbers of days with rainfall greater than 1". The months of December through March historically have the greatest number of days with rainfall exceeding 0.10" and 0.50". Rainfall events during these months are typically of a longer duration.

Winds - The prevailing wind direction between February and September ranges between South and South Southwest (180 to 200 degrees) and between October and January is North Northeast (20 degrees). The annual mean wind speed is 8.5 MPH, with August having the lowest (7.3 MPH) and March the highest (10.0 MPH) mean wind speed.

River discharges - The South Edisto River originates in the midlands of South Carolina and flows approximately 140 miles through the piedmont and coastal plain until it enters the Atlantic Ocean at Edisto Beach. It is the St. Helena Sound estuary's major freshwater source. The river discharges at an average rate of 2631 cubic feet per second. The Ashepoo River and Salkahatchie/Combahee Rivers also contribute to freshwater input, but to a lesser degree.

WATER QUALITY STUDIES

DESCRIPTION OF THE PROGRAM

The Department currently utilizes a systematic random sampling (SRS) strategy within Area 16A in lieu of sampling under adverse pollution conditions. In order to comply with NSSP guidelines, a minimum of thirty samples are required to be collected and analyzed from each station during the review period. Sampling dates are computer generated prior to the beginning of each quarterly period thereby insuring random selection with respect to tidal stage and weather. Day of week selection criteria is limited to Mondays, Tuesdays, and Wednesdays due to shipping requirements and laboratory manpower constraints. Sample schedules are rarely altered.

During July, 1998, an updated data analysis procedure was formalized. Samples utilized for classification purposes are limited to those samples collected in accordance with the SRS for a 36-month period beginning January 1 and ending December 31. This allows for a maximum of 36 samples per station yet provides a six-sample cushion (above the NSSP required 30 minimum) for broken samples, lab error, breakdowns, etc. This also allows each annual report to meet the NSSP Triennial Review sampling criteria.

Six hundred eleven (611) routine surface water quality samples (<1.0 ft. deep) were collected for bacteriological analyses at 17 active water quality sampling stations in Area 16A during the period 01/01/03 through 12/31/05. The samples were collected in 120 ml amber glass bottles, immediately placed on ice and transported by bus to the South Carolina Department of Health and Environmental Control's Trident District Environmental Quality Control laboratory at North Charleston, South Carolina or the Low Country District Environmental Quality Control laboratory at Beaufort, South Carolina. An additional 120 ml water sample was included with each shipment as a temperature control. Upon receipt at the laboratory, sample sets that exceeded a 30-hour holding time or contained a temperature control > 10 degrees C. were discarded.

Samples collected after September 1, 1986 have been analyzed using the five tube/three dilution modified A-1 method described by Nuefeld (1985). Surface water temperatures were measured utilizing hand-held, laboratory-quality calibrated centigrade thermometers. Salinity measurements were measured in the laboratory using automatic temperature compensated refractometers. Additional field data include ambient air temperature, wind direction, tidal stage and date and time of sampling. Tidal stages were determined Nautical Software's Tides and Currents, Version 2 (1996).

Water quality at station 19 in Rock Springs Creek has exceeded the statistical criteria for an Approved classification since at least 1996. In the 2004 Annual Update, water quality at station 13, at the confluence of Rock Springs Creek with Lucy Point Creek, met the statistical criteria for a Restricted classification for the first time. It appears that Rock Springs Creek may be impacting water quality at Station 13. In 2004, that portion of Lucy Point Creek became a Conditionally Approved area and a special sampling study began in Rock Springs and Lucy Point creeks. The study began in August 2004 and was due to be completed in August 2005. The Conditionally Approved portion of Lucy Point Creek was re-classified as Restricted in the 2005 Annual Update. Bacteriological samples are collected monthly from two sampling sites within Rock Springs Creek as well as seven sites in stormwater drainage systems discharging into both creeks. To date, the special sampling study has not been summarized.

MONITORING RESULTS

Stations 8, 9, 10, 11, 13A, 13B, 14, and 24 do not exceed a fecal coliform MPN geometric mean value of 14 nor a fecal coliform MPN estimated 90th percentile value of 43, and thus meet statistical criteria for an Approved classification. Stations 13, 18, 19, 23, 25, 27, 28, and 37 exceed a fecal coliform MPN geometric mean value of 14 and/or a fecal coliform MPN estimated ninetieth percentile value of 43, and therefore exceed statistical criteria for an Approved classification.

A minimum of 30 water quality samples from each sampling location is required to classify that portion of a growing area represented by the associated stations. Stations 33, 34, 35, 36, and 38 are new stations where sampling was initiated in January 2006.

CONCLUSIONS

Based on review of fecal coliform bacteriological data and the pollution source survey, Area 16A is impacted by three sources of actual or potential pollution.

NONPOINT SOURCE RUNOFF

Stormwater runoff is a major source of fecal coliform bacteria contamination in Area 16A. The impact of rainfall on water quality is greater in tidal creeks such as Jenkins, Coffin and Eddings Creeks than in the more open water areas of the Morgan River. Areas with low tidal exchanges such as Warsaw Flats are also impacted to a greater extent when rainfall events occur. Possible sources of fecal coliform bacteria contamination include failing septic systems, pets, domestic animals such as horses and cows, wildlife, and drainage from roads and freshwater wetlands.

Portions of Area 16A receive appreciable freshwater inflow from the Combahee River and St. Helena Sound, particularly in the spring. Abnormally high rainfall during the El Niño event in the spring of 1998 caused a dramatic increase in freshwater inflow and lowering of salinity in the St. Helena Sound estuary. This low salinity water was transported throughout Area 16A by tidal exchange.

INDIVIDUAL SEWAGE TREATMENT AND DISPOSAL SYSTEM.

Almost all homes adjacent to shellfish waters in Area 16A are served by ISTDs. Soils in most areas are considered to be suitable for ISTDs and systems should operate properly if maintained. However, many older homes with existing systems may not meet current standards.

RECOMMENDATIONS

Water quality at Station 30(37) in Jenkins Creek, collected at the Polawana boat ramp, exceeds the statistical criteria for an Approved classification. Analysis of sampling data for the review period was conducted. Excluding sample results that had 24-hour rainfall amounts greater than or equal to 1.10 inches within 14 days prior to the day of sampling, data demonstrates that Station 30(37) will meet criteria for an Approved classification (see Table 3). It is recommended that the portion of Jenkins Creek between Station 14 at the mouth of Doe Creek and station 30(37) remain as a Conditionally Approved classification.

Water quality at Station 25, Jenkins Creek at the small, unnamed tributary on the North side of Warsaw Island, exceeds the statistical criteria for an Approved classification, with an estimated ninetieth percentile MPN value of 48. Analysis of sampling data for the review period was conducted and, upon exclusion of samples collected within 14 days following a 24-hour rainfall event of 1.10 inches or more, analysis demonstrates that Station 25 will meet criteria for an Approved classification. It is recommended that this area between Stations 30(37) and Station 35, including all tributaries and marshlands adjacent to Polawana Island, Warsaw Island, Warsaw Flats, Chowan Creek, and Sparrow Nest Creek, be classified as Conditionally Approved and managed as part of the existing Jenkins Creek Conditional Area. The closure

criteria for the entire Jenkins Creek conditional management area will be 1.10" or more of rainfall in a 24-hour period. Following temporary closures of this area due to rainfall and prior to reopening, stations 14, 25, 35, 36, 37, and 39 (see below) should be required to be sampled and exhibit bacteriological water quality acceptable for shellfish harvest.

Station 16A-39 should be created at the confluence of Sparrow Nest Creek and Morgan River. Sparrow Nest Creek should be included as part of the Jenkins Creek Conditional Area.

Station 23, Eddings Creek at small Tributary between stations 9 and 18, exceeds statistical criteria for an Approved classification. It is recommended that Eddings Creek, from its headwaters to the confluence with the Morgan River, be classified as Restricted.

Due to its shallow location that often results in sample contamination from sediments, Station 32 has been deactivated and Station 38 created to more accurately assess water quality in Village creek. It is recommended that Village Creek be classified as Restricted in its entirety until a minimum of 30 samples have been collected and evaluated.

For this review period, Station 27 (Mouth of Coffin Creek) exceeds the statistical criteria for an Approved classification. It is recommended that Coffin Creek remain Restricted in its entirety; however, because the closest shellfish harvest areas are located approximately 1000 meters eastward of Station 27, that portion of Area 16A extending from Station 27 towards Harbor River should retain an Approved classification.

The shoreline survey and bacteriological data review of shellfish Management Area 16A indicates that changes in classification boundary descriptions are appropriate. The following growing waters classification of Area 16A is recommended:

Prohibited: (Administrative closure)

- 1) Dataw Marina closure zone;
- 2) Coffin Creek commercial docks;
- 3) Eddings Creek (Rose Island) commercial docks.

Restricted:

- 1) Rock Springs Creek, from its headwaters to its confluence with Lucy Point Creek;
- 2) Lucy Point Creek, from Station 13A to Station 13B;
- 3) Coffin Creek and adjacent marshlands and tributaries, from its headwaters to the Morgan River;
- 4) Village Creek and adjacent marshland and tributaries, from the headwaters to the Morgan River;
- 5) Eddings Creek and adjacent marshland and tributaries from the headwaters to the Morgan River;

Conditionally Approved:

- 1) Jenkins Creek, between Stations 14 and Station 3,5 including marshlands and tributaries adjacent to Dataw Island, Polawana Island, Warsaw Island, and Warsaw Flats.

Approved: The remaining waters of Area 16A.

Station Addition/Deactivation/Modification:

Addition: 16A-39 Sparrow Nest Creek at the confluence of Morgan River
Latitude 32-26-47.6 / Longitude 80-35-38.7

Analysis of sampling data for Area 16A demonstrates the probability of a significant impact from rainfall exceeding 4.00" in a 24 hour period. Therefore, a precautionary closure of area 16A will be implemented following rainfall events of greater than 4.00" in a 24- hour period, as measured at the Beaufort-7-SW Weather Station. This methodology is associated with the concept of the Probable Maximum Precipitation (PMP). PMP estimates for the coastal United States has been published in a series of hydro-meteorological reports (HMRs) by the National Weather Service (National Weather Service). PMP estimates for South Carolina's growing areas are derived from HMRs 51, 52, and 53 (National Research Council, 1985).

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TABLE #1
Shellfish Management Area 16A
WATER QUALITY SAMPLING STATIONS DESCRIPTION

<u>Station</u>	<u>Description</u>
08	Morgan River at Village Creek
09	Eddings Creek at Morgan River
10	Parrot Creek at Morgan River
11	Jenkins Creek at Morgan River
13	Lucy Point Creek at Rocky Springs Creek
13a	South Edge of (former) Lucy Point Creek CSZ at Pollution Line
13b	North Edge of (former) Lucy Point Creek CSZ at Pollution Line
14	Doe Creek Behind Coastal Seafood - Behind Dataw Island
18	Eddings Creek at Shrimp Dock
19	Upper Reaches Rock Springs Creek
23	Eddings Creek at Small Tributary Between Stations 9 and 18
24	Jenkins Creek at Right Turn Between Stations 11 and 14
25	Jenkins Creek at Small Unnamed Tributary North Side of Warsaw Island
27	Mouth of Coffin Creek at Morgan River
28	Headwaters of Coffin Creek at Shrimp Docks
33	Lucy Point Creek, approximately 3100 feet West of station 16A-13B (New 2006)
34	Lucy Point Creek, approximately 1900 feet South of station 16A-13 (New 2006)
35	Warsaw Flats at confluence with Morgan River (New 2006)
36	Jenkins Creek, at Southern Point of Dataw Island (New 2006)
37	Jenkins Creek at Polawana Island boat ramp (New 2006)
38	Village Creek at confluence with small unnamed tributary on Western bank (New 2006)
39	Mouth of Sparrow Nest Creek at confluence with Morgan River (New 2007)

Figure 1.
Shellfish Management
Area 16A
Prior Classification

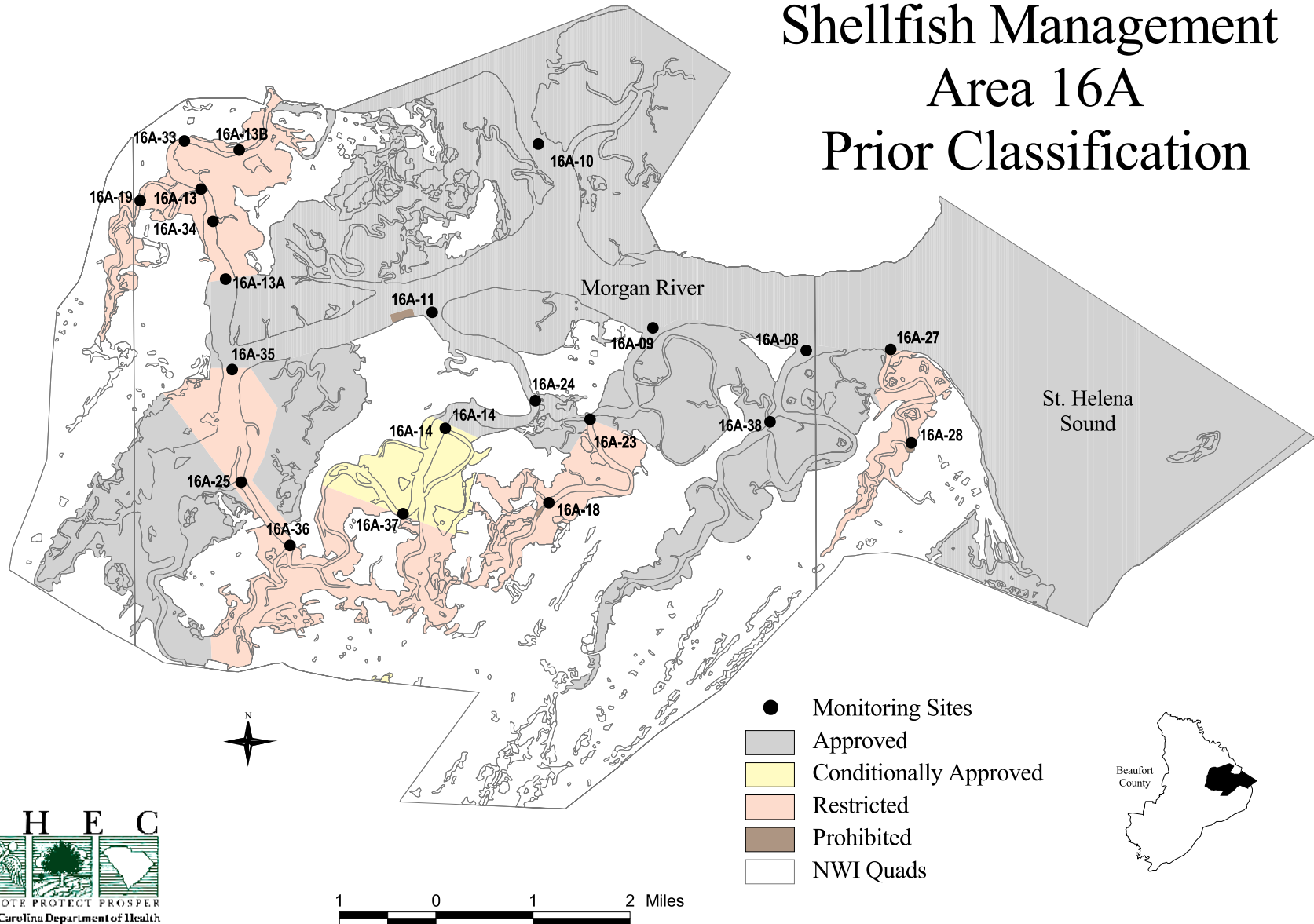


Figure 2.
Shellfish Management
Area 16A
Current Classification

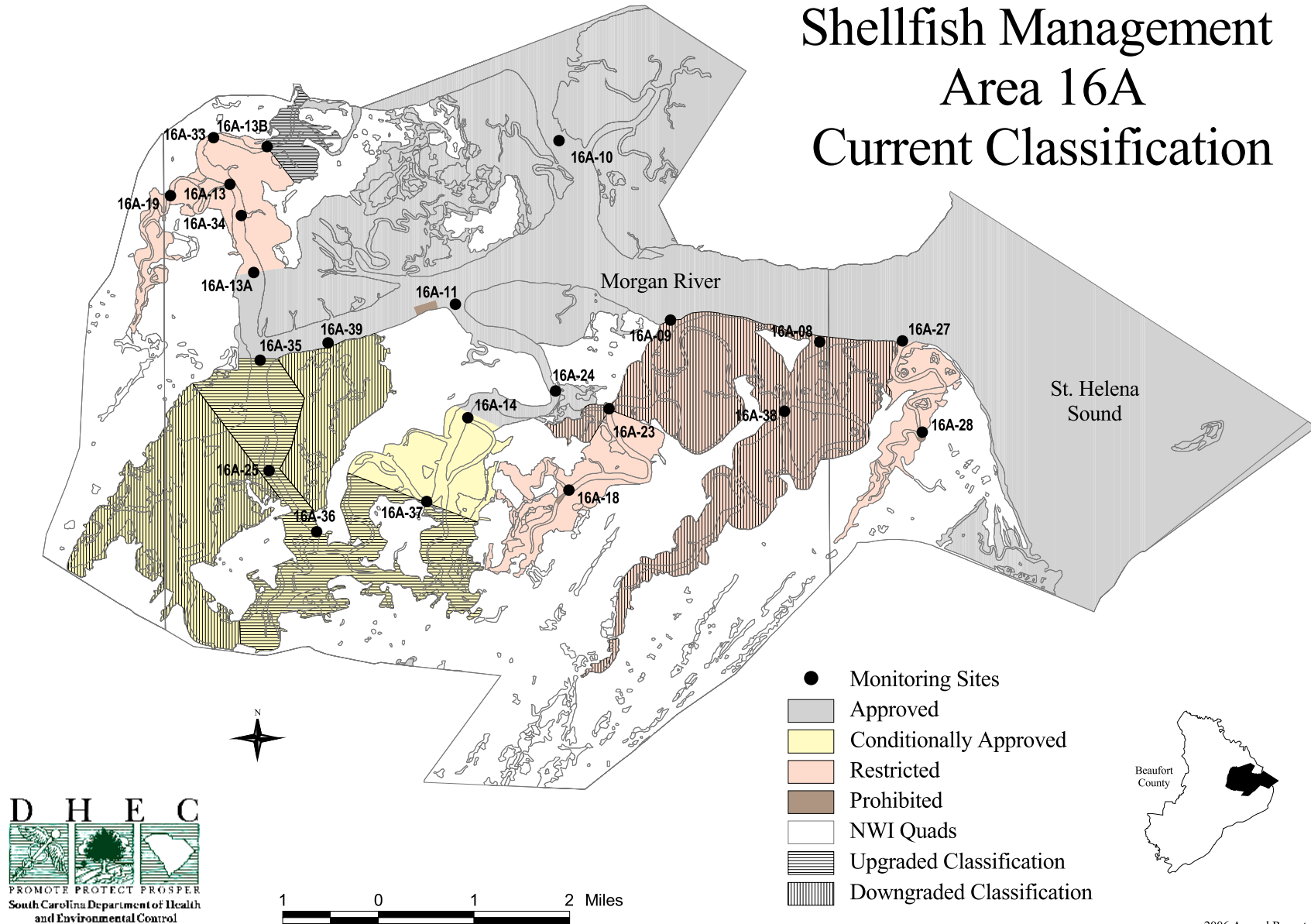


Figure 3.
Shellfish Management
Area 16A
Potential Pollution Sources

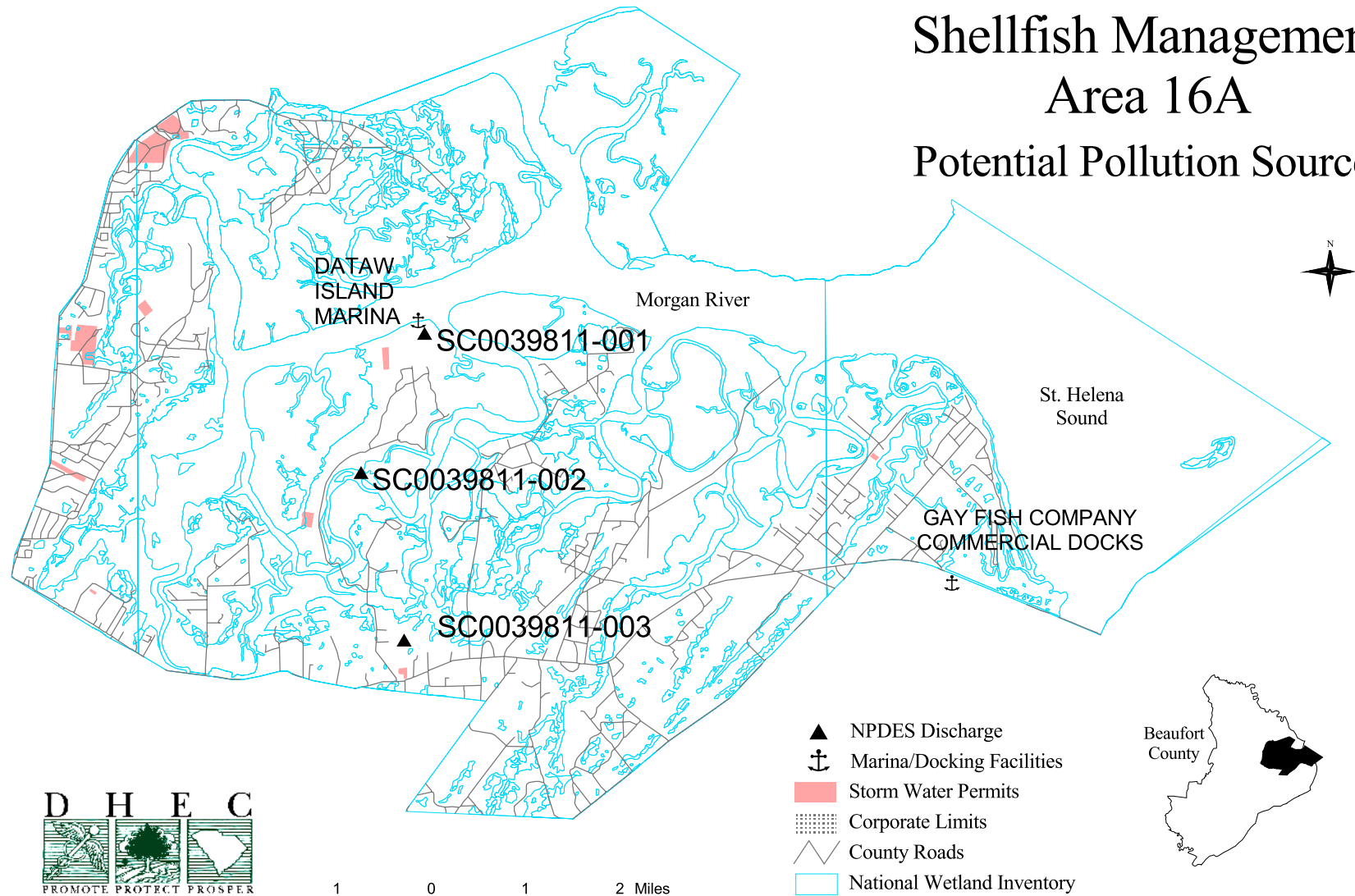


TABLE #2
Shellfish Management Area 16A

FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
FROM SHELLFISH WATER QUALITY SAMPLING STATIONS BETWEEN

January 1, 2003 and December 31, 2005

Station ►	08	09	10	11	13	13A	13B	14	18	19
SAMPLES	36	36	36	36	36	36	36	36	36	36
GEOMEAN	5.1	6.7	3.5	5.2	15.0	8.9	10.6	8.5	18.8	33.9
ESTIMATED	15	25	9	17	112	33	41	35	99	243
WATER QLTY	A	A	A	A	R	A	A	A	R	R
CLASSIFICATION	A	R	A	A	R	R	R	CA	R	R

Station ►	23	24	25	27	28	30(37)	32	33	34	35
SAMPLES	36	36	36	36	36	36	35			
GEOMEAN	10.2	5.8	9.6	8.6	23.9	10.0	10.9			
ESTIMATED	45	17	48	47	225	57	45			
WATER QLTY	R	A	R	R	R	R	R			
CLASSIFICATION	R	A	CA	R	R	CA	R	New	New	New

Station ►	36	38	39							
SAMPLES										
GEOMEAN										
ESTIMATED										
WATER QLTY										
CLASSIFICATION	New	New	New							

A - Approved CA - Conditionally Approved R - Restricted
RND - Restricted/No Depuration P - Prohibited

Table 3
SPECIAL DATA SET
Shellfish Management Area 16A
FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
From Selected Stations

Stations 25 and 30 (37), excluding sample dates preceded by rainfall events greater than or equal to 1.10" in a 24-hour period between January 1, 2003 and December 31, 2005

Station # ►	25	30 (37)
SAMPLES	19	19
GEO MEAN	7.9	7.3
90TH %ILE	36	37
WATER QLTY	A	A
CLASSIFICATION	CA	CA

A - Approved CA - Conditionally Approved R - Restricted
RND - Restricted/No Depuration P - Prohibited

TABLE #4

WATER QUALITY SAMPLING STATIONS DATA

Shellfish Management Area 16A

Detailed data for each shellfish monitoring station listed in this report's "Fecal Coliform Bacteriological Data Summary Table" and in other shellfish reports, can be obtained by writing South Carolina's Department of Health and Environmental Control – Freedom of Information Office at the address below.

Freedom of Information
SC Dept. of Health & Envir. Control
2600 Bull Street
Columbia, SC 29201

Any explanation or clarity needed on the report's content can be obtained by contacting the preparer(s), and/or reviewer(s) listed on the cover page.

TABLE #5

RAINFALL DATA

Shellfish Management Area 16A

AREA 16A ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: City of Beaufort Wastewater Treatment Plant

Beaufort, SC (Station #380559 / 7-SW)

2003	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.32	0.00	0.00	0.00	0.00	1.00	0.02	0.00	0.22	0.00	0.00	0.00
2nd	0.00	0.00	0.47	0.00	0.00	0.00	0.61	0.14	0.00	0.00	0.00	0.00
3rd	0.00	0.00	0.01	0.00	0.10	0.00	0.84	0.00	0.00	0.00	0.00	0.00
4th	0.00	0.02	0.33	0.00	0.03	0.86	0.00	0.00	0.03	0.00	0.06	0.47
5th	0.00	0.03	0.08	0.00	0.00	0.51	0.03	0.56	0.02	0.00	0.05	0.44
6th	0.00	0.00	0.02	0.03	0.00	0.00	0.01	0.00	2.10	0.00	0.00	0.00
7th	0.00	0.42	1.04	0.09	0.43	0.16	0.00	0.30	0.15	0.01	0.00	0.00
8th	0.00	0.03	0.55	0.96	0.00	0.70	0.05	0.00	0.27	0.02	0.00	0.00
9th	0.00	0.00	0.02	1.26	0.00	0.36	0.00	0.00	0.15	0.07	0.00	0.00
10th	0.00	0.12	0.01	0.72	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00
11th	0.00	0.31	0.00	0.15	0.00	0.00	0.00	0.02	0.00	0.02	0.00	--
12th	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13th	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00
14th	0.00	0.00	0.56	0.00	0.00	0.66	0.11	0.00	0.00	0.00	0.00	0.33
15th	0.00	0.00	0.21	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00
16th	0.00	0.00	0.15	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17th	0.00	1.40	0.02	0.00	0.12	0.25	0.00	0.08	0.00	0.00	0.00	0.02
18th	0.00	0.05	0.38	0.00	1.92	0.26	0.00	0.36	0.00	0.07	0.00	0.00
19th	0.00	0.00	0.10	0.00	2.80	1.14	0.00	2.42	0.00	0.00	0.00	0.00
20th	0.00	0.00	0.11	0.00	0.00	0.00	3.95	0.00	0.00	0.00	0.36	0.00
21st	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00
22th	0.03	0.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23rd	0.23	0.58	0.00	0.00	3.01	0.00	0.00	0.00	0.25	0.00	0.00	0.00
24th	0.00	0.00	0.00	0.00	0.00	0.00	1.85	0.00	0.05	0.00	0.00	0.04
25th	0.00	0.00	0.00	0.00	0.04	0.00	1.29	0.16	0.00	0.00	0.00	0.00
26th	0.00	0.00	0.00	1.34	0.16	0.00	0.62	0.51	0.00	0.00	0.00	0.00
27th	0.00	0.45	0.00	0.46	0.11	0.00	0.20	0.03	0.00	0.00	0.00	0.00
28th	0.00	0.09	0.01	0.00	0.00	0.00	0.63	0.00	0.00	0.25	0.00	0.00
29th	0.00		0.00	0.00	0.00	1.00	0.36	0.00	0.00	2.60	0.21	0.00
30th	0.00		0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00
31st	0.00		0.30		0.00		0.00	0.00		0.00		0.00

(Monthly Figures)

Year's Rainfall Total:

54.52

SUM	0.58	3.52	4.75	5.08	9.00	7.05	11.17	5.07	3.28	3.04	0.68	1.30
MAX	0.32	1.40	1.04	1.34	3.01	1.14	3.95	2.42	2.10	2.60	0.36	0.47
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.02	0.13	0.15	0.17	0.29	0.24	0.36	0.16	0.11	0.10	0.02	0.04

"ND"/"--" = no data (Shaded/bold cells indicate the dates shellfish waters were sampled.)

AREA 16A ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: City of Beaufort Wastewater Treatment Plant

Beaufort, SC (Station #380559 / 7-SW)

2004	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.00	0.00	0.00	0.00	0.02	0.09	0.13	1.23	0.60	0.00	0.00	0.00
2nd	0.00	0.00	0.00	0.00	1.36	0.02	0.05	0.12	0.25	0.00	0.00	0.00
3rd	0.00	0.28	0.00	0.00	1.26	0.00	0.01	0.40	0.40	0.00	0.00	0.00
4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5th	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.10	0.00	0.10	--
6th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.59	0.00	0.00	0.03
7th	0.00	0.43	0.00	0.00	0.00	0.09	0.00	0.00	1.20	0.00	0.00	0.00
8th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00
9th	0.10	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.02
10th	0.36	0.00	0.12	0.00	0.00	0.03	0.36	0.00	0.00	0.00	0.00	0.06
11th	0.00	0.00	0.00	0.00	0.00	1.74	0.10	0.00	0.26	0.00	0.00	--
12th	0.00	0.61	0.00	1.16	0.10	0.00	1.28	0.00	0.40	0.00	0.05	0.00
13th	0.00	0.35	0.00	0.28	0.00	0.00	0.00	1.90	0.00	0.00	--	0.00
14th	0.00	0.47	0.00	0.11	0.00	0.78	0.00	0.39	0.00	0.00	0.00	0.00
15th	0.00	0.56	0.00	0.00	--	0.86	0.00	0.76	0.50	0.39	0.00	0.00
16th	0.00	0.05	0.20	0.00	--	0.82	0.00	0.03	0.50	0.35	0.00	0.00
17th	0.00	0.10	0.00	0.00	0.03	0.06	0.00	0.00	0.03	0.00	0.00	0.00
18th	0.04	0.01	0.00	0.00	0.00	0.00	0.43	0.15	0.00	0.00	0.00	0.00
19th	0.03	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.00
20th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.00	0.00
21st	0.00	0.00	0.00	0.00	0.00	0.16	1.10	0.00	0.00	0.00	0.06	0.00
22th	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.08	--
23rd	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.33	0.00	0.00	0.00	0.00
24th	0.00	0.70	0.00	0.00	0.00	0.21	0.00	1.25	0.00	0.00	0.00	0.00
25th	0.02	0.02	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.29	1.52
26th	0.01	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
27th	1.32	0.06	0.00	0.31	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
28th	0.02	0.00	0.00	0.00	0.00	0.18	0.00	0.21	0.07	0.00	0.50	0.00
29th	0.00		0.00	0.00	--	0.00	0.00	0.24	0.00	0.51	0.00	0.00
30th	0.00		0.00	0.00	--	0.00	0.16	0.00	0.00	0.00	--	--
31st	0.00		0.06		--		0.00	0.50		0.00		--
(Monthly Figures)												Year's Rainfall Total: 42.08
SUM	1.90	4.52	0.38	1.91	2.77	5.76	5.00	7.61	7.01	2.25	1.08	1.89
MAX	1.32	0.88	0.20	1.16	1.36	1.74	1.28	1.90	2.00	0.52	0.50	1.52
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.06	0.16	0.01	0.06	0.11	0.19	0.16	0.25	0.23	0.07	0.04	0.07

"ND"/"--" = no data (Shaded/bold cells indicate the dates shellfish waters were sampled.)

AREA 16A ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: City of Beaufort Wastewater Treatment Plant

Beaufort, SC (Station #380559 / 7-SW)

2005	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.00	0.00	0.00	0.00	0.20	1.34	0.00	1.10	0.12	0.00	0.00	0.00
2nd	0.00	0.00	0.00	0.86	0.00	0.03	0.40	0.00	0.00	0.00	0.00	0.00
3rd	0.00	0.20	0.00	0.00	0.00	2.03	0.00	0.00	0.00	0.00	0.00	0.00
4th	0.00	0.50	0.00	0.00	0.00	0.67	0.11	0.00	0.00	0.30	0.00	0.06
5th	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.30	0.00	0.00
6th	0.00	0.00	0.00	0.00	1.72	0.16	0.70	0.00	0.00	2.20	0.00	1.10
7th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.14	0.00	0.00
8th	0.00	0.00	0.32	0.92	0.00	0.00	0.00	0.70	0.00	0.66	0.00	0.11
9th	0.02	0.00	0.09	0.00	0.00	0.30	1.15	0.33	0.00	0.00	0.00	0.77
10th	0.00	0.20	0.00	0.00	0.00	0.00	0.40	0.40	0.00	0.63	0.00	0.00
11th	0.00	0.00	0.00	0.00	0.32	0.20	0.00	0.10	0.00	0.00	0.00	0.00
12th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.02	0.00	0.00
13th	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.02	0.00	0.03	0.00	0.00
14th	0.70	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
15th	0.80	0.70	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.04	0.02
16th	0.00	0.00	0.84	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.15
17th	0.00	0.00	0.62	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.02
18th	0.00	0.00	0.05	0.00	1.46	0.00	0.00	0.68	0.00	0.00	0.00	1.31
19th	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.03
20th	0.00	0.00	0.00	0.00	0.00	2.03	0.00	0.00	0.00	0.00	0.00	0.00
21st	0.00	0.00	0.00	0.00	1.14	0.00	0.00	0.00	0.00	0.00	3.40	0.00
22th	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.14	0.00
23rd	0.00	0.00	2.11	0.25	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00
24th	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.46	0.00	0.00
25th	0.70	0.00	0.02	0.00	0.00	0.17	0.00	0.75	0.00	0.00	0.00	0.09
26th	0.00	0.07	0.18	0.00	0.00	0.31	0.00	0.00	0.09	0.00	0.00	0.01
27th	0.00	0.07	3.12	0.80	0.00	0.04	0.00	1.25	0.00	0.00	0.11	0.00
28th	0.00	1.47	2.72	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.70	0.00
29th	0.20		0.04	0.00	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.20
30th	0.55		0.00	0.00	0.52	0.08	0.00	0.00	0.00	0.00	0.00	0.00
31st	0.00		0.00		0.00		0.06	0.23		0.00		0.00

(Monthly Figures)

Year's Rainfall Total:

59.83

SUM	2.97	3.81	10.11	2.99	6.29	9.73	3.81	6.34	0.21	5.31	4.39	3.87
MAX	0.80	1.47	3.12	0.92	1.72	2.03	1.15	1.25	0.12	2.20	3.40	1.31
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.10	0.14	0.33	0.10	0.20	0.32	0.12	0.20	0.01	0.17	0.15	0.12

(Shaded/bold cells indicate the dates shellfish waters were sampled.)

CONDITIONAL AREA MANAGEMENT PLAN

Shellfish Management Area 16A

**Shellfish Management Area 16A
JENKINS CREEK
CONDITIONAL AREA MANAGEMENT PLAN**

September 2006

I. AREA DESCRIPTION

The 2005 Annual Update established the following Conditionally Approved area:

Jenkins Creek, between stations 14 and 37 (former station 30).

Station 30 is being identified in current reports as Station 30(37). The 2006 Annual Update included the following recommendation for expansion of the Jenkins Creek's Conditionally Approved area:

It is recommended that the area between Stations 30(37) and Station 35, including all tributaries and marshlands adjacent to Polawana Island, Warsaw Island, Warsaw Flats, Chowan Creek, and Sparrow Nest Creek, be classified as Conditionally Approved and managed as part of the existing Jenkins Creek Conditional Area.

A classification map reflecting the boundaries of the Jenkins Creek Conditionally Approved area is included in the 2006 Annual update.

The Jenkins Creek Conditionally Approved area is located within Culture Permits C-122 and C-114, which is leased by SCDNR to L. P. Maggioni & Company. In the 2006 Annual Update, the boundary of the Jenkins Creek Conditional Area has been expanded. A new station (16A-39) at the mouth of Sparrow nest Creek will be activated and managed in conjunction with the Jenkins Creek Conditional Area. The new boundary will encompass stations 14, 25, 30(37), 35, 36, and 39. This boundary includes all tributaries surrounding Polawana and Warsaw Islands, Warsaw Flats, Chowan Creek, and Sparrow Nest Creek.

For the 2006 Annual Update review period, water quality collected at Stations 25 and 37 exceed the statistical criteria for an Approved classification. Analysis indicates that, when bacteriological water quality data collected within 14 days following rainfall events of 1.10 inch or more per 24-hours is excluded, the stations will meet Approved area criteria.

The rainfall criteria established to manage the Conditionally Approved area will remain at 1.10 inches or more per 24-hour period, as measured at the BJW&SA Southside WWTP. Additional precipitation measurement stations may be used to supplement the Southside WWTP data.

There are no mariculture operations within the Conditionally Approved area; therefore year round harvesting does not occur. The Jenkins Creek Conditionally Approved area will be monitored for management plan criteria violations from September 1 through May 31.

II. FACTORS INDICATING SUITABILITY OF JENKINS CREEK AS A CONDITIONALLY APPROVED AREA

- B. The major pollution source adversely affecting water quality in the Jenkins Creek Conditionally Approved area is nonpoint source in origin.
- C. The area receives no substantial freshwater input other than from rainfall and associated runoff.
- D. The area has a tidal range that facilitates sufficient exchange with coastal ocean waters. This exchange results in a typical salinity range of 18 to 35 ppt. Depressed salinities due to rainfall are temporary.
- E. The area does not present any patrol difficulties.

III. PREDICTABLE POLLUTION EVENTS THAT CAUSE CLOSURE

A. Meteorological Events

1. The Jenkins Creek Conditionally Approved area will be closed upon receipt of 1.10" or more of rainfall, as measured at weather station 380559- Beaufort 7 SW, located at the BJW&SA Southside WWTP.

Station #	14	25	35	36	30(37)	39
SAMPLES	36	36	New	New	36	New
GEOMEAN	8.5	9.6	New	New	10.0	New
90TH %ILE	35	48	New	New	57	New
WATER QLTY	A	R	New	New	R	New
CLASSIFICATION	A	CA	New	New	CA	New

2. Analysis of data excluding samples taken following rainfall events of 1.10" or more in a 24-hour period collected between 01/01/03 and 12/31/05 indicates that existing Stations 25 and 30(37) will meet the statistical criteria for an Approved classification. This supports management of this area based upon rainfall of 1.10" or more in a 24-hour period. Additional monitoring stations have been also been created within the area.

FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
Stations 25 and 30(37), excluding rainfall greater than or equal to 1.10"
in a 24-hour period between
January 1, 2003 and December 31, 2005

Station #	25	30 (37)
SAMPLES	19	19
GEOMEAN	7.9	7.3
90TH %ILE	36	37
WATER QLTY	A	A
CLASSIFICATION	CA	CA

A review of rainfall data for the period 2001 to 2005 indicates that the area will receive an average of 5.4 rainfall events per year during shellfish harvesting season equal to or greater than 1.10". Although some events are likely to crossover, each event is considered to be separated from the subsequent event by a minimum duration of 14 days. With this in mind, one could expect the Conditionally Approved area in Jenkins Creek to remain in an open status 69 % (166 days) of the harvest season (September 16 through May 15; a total of 242 days).

Number of 24- hour Rainfall events > or = 1.10 inches Sept. 16 to May 15

2001	0
2002	8
2003	4
2004	6
2005	9

Total 27 / 5yrs = 5.4 days/yr.

5.4 x 14 day closure = 75.6days closed/yr.

(75.6 / 242 days in harvest season= 31% closed, 69% open)

B. Seasonal Events

Any significant input from migratory waterfowl populations is offset by tidal flushing.

IV. IMPLEMENTATION OF A CONDITIONAL AREA CLOSURE

The Region 8 EQC Shellfish Sanitation Program manager is the responsible party for determining compliance with all aspects of this plan, including the tracking of rainfall criteria violations. In the event that the manager shall be unavailable, a responsible employee shall be designated responsibility for tracking, compliance, and notification procedures.

A. Implementation of Closure (September through May): The following procedures shall be used in the event a closure is necessary:

1. The State Shellfish Sanitation Program Manager shall be notified upon determination of the need for any closure. Media notification shall be coordinated through the Shellfish Sanitation Program and the Office of Media Relations.
2. The Office of Media Relations is the responsible authority for issuance of news releases. Media Relations shall be notified as soon as possible upon determination of the need for a closure. They shall be provided with specific information regarding the pollution event and affected area. In the event of the need for a weekend or holiday closure, Media Relations shall be contacted through their on-call pager number or through the Department's emergency response telephone number.
3. As soon as practical following the issuance of a closure notice, Regional Shellfish staff shall notify the South Carolina Department of Natural Resources (SCDNR), Office of Commercial Fisheries Management, & SCDNR Law Enforcement, by telephone, fax, and/or email communication.
4. Regional Shellfish Sanitation Program staff shall notify certified shippers and permitted aquaculturists with known interests in the affected area. SCDNR is the State agency having authority for the issuance of individual commercial shellfish harvest permits and may provide notification to individual harvesters.
5. During the closure period, District Shellfish Sanitation Program officers shall insure patrols are conducted at a frequency to deter illegal harvest activities. Scheduling should include night and weekend patrols and documentation of these patrols shall be maintained.

B. Management of Conditional Areas Extraneous to the Normal Shellfish Harvest Season

The Jenkins Creek Conditionally Approved area shall not require monitoring for violation of management plan rainfall criteria between June 1 and September 1 unless mariculture permits are established within the area.

C. Enforcement of Closures

1. DHEC is the agency responsible for public health protection. This includes public notice and closures of shellfish management areas.
2. Regional Shellfish Sanitation Program officers shall insure that the area is patrolled at a frequency sufficient to deter illegal harvesting. Documentation of these patrols shall be maintained. District Shellfish Sanitation Program officers are encouraged to coordinate patrol activities with other law enforcement agencies to provide adequate area coverage.

V. CONTROL ELEMENTS USED TO REOPEN AFTER A POLLUTION EVENT

Opening of areas following closure due to violation of management plan criteria shall adhere to the following control elements.

- A. The area shall remain closed for a minimum period of 14 consecutive days following the end of a rainfall event. If, during the initial closure period, a subsequent event occurs that meets the criteria for a closure, the area shall remain closed for 14 consecutive days following the occurrence of the subsequent event.
- B. The bacteriological water quality at all stations located within, or on the boundary of, the closed Conditionally Approved area shall be assessed prior to reopening. For this report this shall include Stations 14, 25, 35, 36, 30(37), and 39. The area shall remain closed and be re-sampled at a later date if any sample exceeds a fecal coliform MPN of 43.
- C. Regional staff and the State Shellfish Sanitation Program Manager shall concur on the decision to reopen the area.
- D. Regional staff shall notify SCDNR, Division of Commercial Fisheries Management, of the opening following issuance of the news release.
- E. Local Certified Shellfish Shippers and aquaculturists shall be notified of the opening by regional staff as soon as possible.

VI. MANAGEMENT PLAN EVALUATION

This plan shall be evaluated once per year and included as a part of the Shellfish Management Area 16A Annual Update.

**Shellfish Management Area 16A
EVALUATION OF JENKINS CREEK
CONDITIONAL AREA MANAGEMENT PLAN**

September 12, 2006

I. BACKGROUND INFORMATION

The following is a description of the Jenkins Creek Conditionally Approved areas as indicated in the July, 2005 Annual Update:

Jenkins Creek, between stations 14 and 37 (former station 30).

The Jenkins Creek Conditionally Approved area was established in the July 2005 Annual Update and has been managed subsequent to the start of the 2005-2006 South Carolina shellfish season (September 16, 2005). Due to the date of implementation, this evaluation period is abbreviated and limited to the period September 16 through December 31, 2005. Closure of the Conditionally Approved area is based on rainfall of 1.10" or greater in a 24-hour period. Rainfall is measured at the BJW&SA Southside WWTP.

The Jenkins Creek Conditionally Approved area is located within Culture Permit C-122, which is leased by SCDNR to L. P. Maggioni & Company. In the 2005 Annual Update, Station 30 was deactivated, as the map location of the station is wrong and cannot be changed in the STORET database. A new sampling station, 37, was created at the correct sampling location, Jenkins Creek at Polawana Island boat ramp in the 2005 Report. Sample results from Station 37 will be combined with those collected from Station 30 until 36 samples have been collected at Station 37. The combined results will be referenced as Station 30(37).

There are no mariculture operations in the area; therefore year round harvesting is not allowed. The harvesting season is from September 16 through May 15.

II. REEVALUATION OF CONDITIONAL CLASSIFICATION

During the evaluation period, there were four (4) rainfall events greater than or equal to 1.10":

Date	Event	Sample Date	Reopening Date
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	Season Opened		09/16/05
10/05/05	Closed - TS Warning (2.20" on 10/06)	10/25/05	10/27/05
11/21/05	Rainfall Closure	12/06/05	12/30/06
12/06/05	Closure Continued (Rainfall 1.10")	12/13/05	12/30/05
12/17/05	Closure Continued (Rainfall 1.31")	12/28/05	12/31/05

- A. **Compliance** - For the evaluation period, compliance with the Jenkins Creek Conditional Management Area plan was satisfactory.
- B. **Cooperation** - Cooperation by BJW&SA Southside WWTP personnel in reporting rainfall events has been excellent. WWTP personnel readily supply necessary rainfall data.
- C. **Evaluation of Water Quality with Respect to the Bacteriological Standards** - For the Annual Update review period (January 1, 2003 through December 31, 2005) for Shellfish Management Area 16A, water quality at Station 30/37 in Jenkins Creek exceeded the statistical criteria for an Approved classification.

For the Annual Update review period, analysis of samples collected while the conditional area was open (CAO) indicates Station 30(37) met the statistical criteria for the Approved classification. Additionally, routine samples collected prior to the season and special samples collected for reopening indicate compliance.

FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY

Station	Date	F.C.MPN	F.C.Log	Type	Status
16A-30 (37)	12/28/2005	4	0.6021	S	CAC
16A-30 (37)	12/13/2005	11	1.0414	S	CAC
16A-30 (37)	12/6/2005	49	1.6902	R	CAC
16A-30 (37)	11/29/2005	2	0.301	S	CAC
16A-30 (37)	11/14/2005	11	1.0414	R	CAO
16A-30 (37)	10/25/2005	21	1.3222	S	CAC
16A-30 (37)	10/18/2005	17	1.2304	S	CAC
16A-30 (37)	10/12/2005	49	1.6902	R	CAC
16A-30 (37)	9/13/2005	5	0.699	R	SC

III. RECOMMENDATIONS

Water quality at new Station 30 (37) in Jenkins Creek at the Polawana boat ramp exceeds statistical criteria for an Approved classification, with an estimated ninetieth percentile MPN value of 57. However, when sample results collected within 14 days following 24-hour rainfall amounts greater than or equal to 1.10 inches are excluded from the data set, Station 30 (37) will meet Approved criteria. It is therefore recommended that the portion of Jenkins Creek between

Station 14 at the mouth of Doe Creek and Station (30) 37 retain a Conditionally Approved classification. Additionally, the Jenkins Creek Conditionally Approved area boundary will be expanded in size based upon information included in the 2006 Shellfish management Area 16A Annual Update and the 2006 Jenkins Creek Conditional Area Management Plan. Closure criteria is recommended to remain at 1.10 inches or more per 24-hours.